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(54) Title: IMPROVED POROUS MULLITE BODIES AND METHODS OF FORMING THEM

(57) Abstract: A porous mullite composition is made by forming a mixture of one or more precursor compounds having the elements present in mullite (e.g., clay, alumina, silica) and a property enhancing compound. The property enhancing compound is a compound having an element selected from the group consisting of Mg, Ca, Fe, Na, K, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, B, Y, Sc, La and combination thereof. The mixture is shaped and to form a porous green shape which is heated under an atmosphere having a fluorine containing gas to a temperature sufficient to form a mullite composition comprised substantially of acicular mullite grains that are essentially chemically bound.

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<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC 7 C04B35/185 C04B35/622 C04B38/00 B01D39/20		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) IPC 7 C04B B01D		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the International search (name of data base and, where practical, search terms used) EPO-Internal, PAJ, INSPEC, WPI Data, CHEM ABS Data, COMPENDEX		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	WO 03/082773 A (DOW GLOBAL TECHNOLOGIES INC ; PRUNIER ARTHUR R JR (US); WALLIN STEN A) 9 October 2003 (2003-10-09) claims 1-6,12-14,16,30; examples 1-6	1-5, 12-14, 16,30
X	PATENT ABSTRACTS OF JAPAN vol. 0165, no. 18 (C-0999), 26 October 1992 (1992-10-26) & JP 4 193782 A (TOSHIBA MONOFRAX CO LTD), 13 July 1992 (1992-07-13) abstract	30
A	US 5 145 806 A (SHIRAKAWA HIROSHI ET AL) 8 September 1992 (1992-09-08) column 3, lines 58-68; example 2	1-18
-/--		
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.		
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family		
Date of the actual completion of the international search 13 October 2004		Date of mailing of the international search report 27/10/2004
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer Vathilakis, S

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 294 576 A (MIZUSHIMA KIHOU ET AL) 15 March 1994 (1994-03-15) claims 1-5	1,8
A	<p>-----</p> <p>DATABASE INSPEC 'Online! THE INSTITUTION OF ELECTRICAL ENGINEERS, STEVENAGE, GB; 2000, HYUNHO SHIN ET AL: "Multitization from a multicomponent oxide system in the temperature range 1200'deg.!--1500'deg.!" XP002300230 Database accession no. 6626547 abstract &amp; HYUNHO SHIN ET AL.: J. OF AMER. CER. SOC, vol. 83, no. 5, May 2000 (2000-05), pages 1237-1240, ISSN: 0002-7820</p> <p>-----</p>	1-16

# INTERNATIONAL SEARCH REPORT

International Application No  
/US2004/012740

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
WO 03082773	A	09-10-2003	WO	03082773 A1	09-10-2003
JP 4193782	A	13-07-1992	JP	2593740 B2	26-03-1997
US 5145806	A	08-09-1992	JP	2778795 B2	23-07-1998
			JP	3281740 A	12-12-1991
US 5294576	A	15-03-1994	JP	1183461 A	21-07-1989
			JP	2079797 C	09-08-1996
			JP	7115917 B	13-12-1995